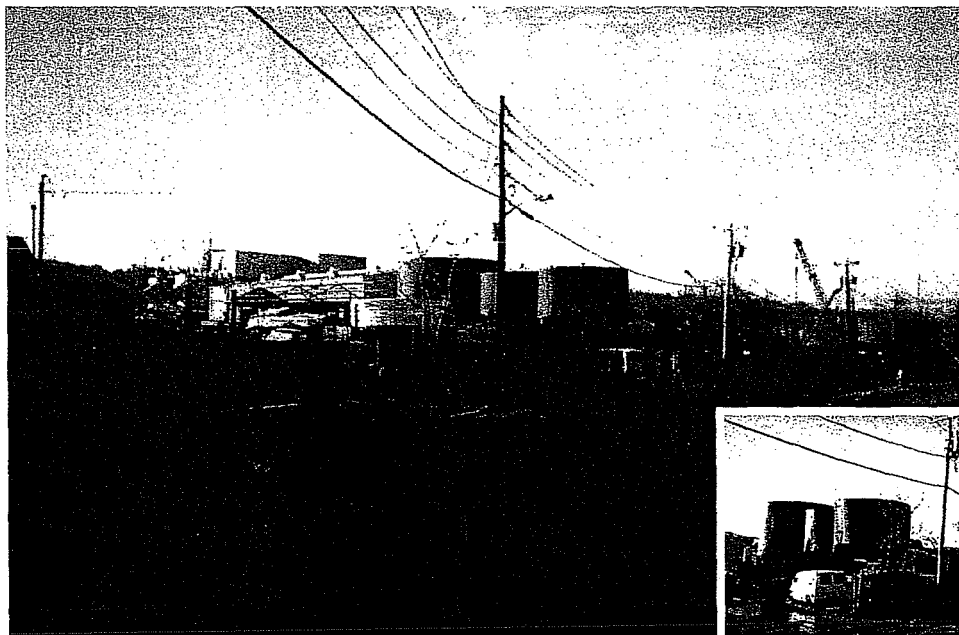




THE CITY OF GLEN COVE

Phase II Environmental Site Assessment Report



Doxey's Property
10 Garvies Point Road, Glen Cove, New York

Prepared For

The City of Glen Cove
Glen Cove, New York

November 2006



DMIRKA AND BARTILUCCI
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. BOSCHKE ASSOCIATES, P.C.

PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT

**DOXEY'S PROPERTY
10 GARVIES POINT ROAD
GLEN COVE, NEW YORK**

Prepared for:

**CITY OF GLEN COVE
COMMUNITY DEVELOPMENT AGENCY**

Prepared by:

**DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
WOODBURY, NEW YORK**

NOVEMBER 2006

**PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT
DOXEY'S PROPERTY
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3.3 Sample Results

3.3.1 Surface Soil

Analytical results for compounds exceeding RSCOs in surface soil samples are summarized in Table 3-1. Analytical results for all compounds analyzed are summarized in Table B-1 (Appendix B). Laboratory data sheets are included in Appendix C.

VOCs were not detected at concentrations above RSCOs in any of the surface soil samples.

No individual SVOCs were detected at concentrations above RSCOs in surface soil samples D-SS-5 and D-SS-7. Concentrations above the RSCOs for SVOCs were detected in each of the other 10 samples included six compounds, the polycyclic aromatic hydrocarbons (PAHs), benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and dibenzo(a,h)anthracene. Concentration ranges for the PAHs were within one order of magnitude of the standard with the exception of benzo (a)pyrene. Additionally, total SVOCs and tentatively identified compounds (TICs) were above the RSCO of 500,000 ug/kg in samples D-SS-2 (572,658 ug/kg) and D-SS-7 (889,300 ug/kg).

Sample D-SS-7 contained one pesticide, aldrin, above its RSCO. Total pesticides in sample D-SS-7 were well below the standard for total pesticides. No exceedances of RSCOs for PCBs were detected in any of the surface soil samples.

Metals concentrations exceeding RSCOs were detected in each of the surface soil samples. Exceedances were detected for arsenic, beryllium, cobalt, copper, iron, mercury, nickel, selenium and zinc. The standards for both iron and zinc were exceeded in each of the 12 samples. The maximum number of compounds detected at concentrations above the RSCOs in any sample was eight, at three locations (D-SS-3, D-SS-9 and D-SS-10), while the minimum number of compounds detected above the RSCOs in any sample was two, in sample D-SS-5.

**TABLE 3-1
COMPOUNDS EXCEEDING STANDARDS, CRITERIA AND GUIDELINES IN SURFACE SOIL SAMPLES
DOXEY'S PROPERTY**

SAMPLE ID	D-SS-1	D-SS-2	D-SS-3	D-SS-4	D-SS-5	D-SS-6	Contract Required Detection Limit	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH (FT)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5		
PERCENT SOLIDS	10/6/2000	10/6/2000	10/6/2000	9/21/2006	10/6/2000	9/20/2006		
DATE OF COLLECTION	69	91	89	91	88	85		
DILUTION FACTOR	1	1	1	10	1	10		
<i>Semivolatile Organics, in ug/kg</i>								
Benzo(a)anthracene	670	1,000	290 J	2,300	U	3,700	330	224 or MDL
Chrysene	890	1,300	420	2,700	53 J	4,600	330	400
Benzo(b)fluoranthene	1,500	1,700	710	4,200	43 J	8,500	330	1,100
Benzo(k)fluoranthene	570	650	250 J	1,400 J	U	2,400	330	1,100
Benzo(a)pyrene	890	1,100	390	2,200	U	3,900	330	61 or MDL
Dibenzo(a,h)anthracene	120 J	170	58 J	190 J	U	U	330	14 or MDL
Total SVOCs + TICs	33,585	572,658	22,963	42,800	501	82,920	--	500,000
<i>Pesticides/PCBs, in ug/kg</i>								
Aldrin	U	U	U	U	U	U	1.7	41
<i>Metals, in mg/kg</i>								
Arsenic	14.5	4.4	17.5	5.5	4.1	4.9	3	7.5 or SB
Beryllium	0.30 B	0.25 B	0.15 B	0.24 B	0.086 B	0.21 B	0.3	0.16 or SB
Cobalt	11.0	3.9 B	30.2	2.2 B	5.3 B	2.9 B	3	30 or SB
Copper	97.9	25.0	126	14.9	20.7	15.5	2	25 or SB
Iron	21,100	11,400	42,000	6,880	7,570	8,070	2	2000 or SB
Mercury	0.25	U	0.38	0.032 B	0.057 B	0.049 B	0.1	0.1
Nickel	21.3	13.0	49.8	4.9 B	10.1	8.6	3	13 or SB
Selenium	1.2	U	2.7	U	U	1.3	5	2 or SB
Zinc	204	48.4	391	68.6	93.1	33.4	2	20 or SB

QUALIFIERS:

U: Compound analyzed for but not detected

J: Compound found at a concentration below the C

B: Compound concentration is less than the CRDL
but greater than the IDL.

NOTES:

MDL: Method Detection Limit

SB: Site background

Result exceeds NYSDEC Recommended Soil Cleanup Objective

**TABLE 3-1
COMPOUNDS EXCEEDING STANDARDS, CRITERIA AND GUIDELINES IN SURFACE SOIL SAMPLES
DOXEY'S PROPERTY**

SAMPLE ID	D-SS-7	D-SS-8	D-SS-9	D-SS-10	D-SS-11	D-SS-12	Contract Required Detection Limit	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH (FT)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5		
DATE OF COLLECTION	10/6/2000	10/6/2000	9/20/2006	10/6/2000	9/20/2006	10/6/2000		
PERCENT SOLIDS	76	85	88	85	93	88		
DILUTION FACTOR	1	1	1	1	1	1		
Semivolatile Organics, in ug/kg								
Benzo(a)anthracene	U	480	940	2,400 D	1,600 J	1,400	330	224 or MDL
Chrysene	U	690	1,300	6,800 D	2,000	1,500	330	400
Benzo(b)fluoranthene	U	1,400	2,300	4,400 D	2,900	1,900	330	1,100
Benzo(k)fluoranthene	U	430	1,000	1,100	1,400 J	690 J	330	1,100
Benzo(a)pyrene	U	680	1,100	1,100	1,800	1,300	330	61 or MDL
Dibenzo(a,h)anthracene	U	120 J	U	210 J	U	150 J	330	14 or MDL
Total SVOCs + TICs	889,300	19,831	19,306	58,945	30,910	122,379	--	500,000
Pesticides/PCBs, in ug/kg								
Aldrin	87 D	U	U	U	U	U	1.7	41
Metals, in mg/kg								
Arsenic	10.9	10.8	24.6	30.3	5.3	4.0	3	7.5 or SB
Beryllium	0.29 B	0.14 B	0.22 B	0.11 B	0.24 B	0.14 B	0.3	0.16 or SB
Cobalt	6.5 B	8.5	4.1 B	57.0	3.9 B	5.1 B	3	30 or SB
Copper	45.2	94.6	59.2	219	43.5	84.5	2	25 or SB
Iron	13,100	31,200	23,000	36,400	9,050	13,900	2	2000 or SB
Mercury	0.17	0.14	0.33	0.62	0.035 B	0.062 B	0.1	0.1
Nickel	13.1	27.0	22.3	54.4	10.0	7.2 B	3	13 or SB
Selenium	2.8	1.0	3.7	3.6	3.1	U	5	2 or SB
Zinc	262	165	67.5	510	38.7	62.8	2	20 or SB

QUALIFIERS:

U: Compound analyzed for but not detected
J: Compound found at a concentration below the CRDL, value estimated
B: Compound concentration is less than the CRDL
but greater than the IDL.

NOTES:

MDL: Method Detection Limit

SB: Site background

Result exceeds NYSDEC Recommended Soil Cleanup Objective

3.3.2 Subsurface Soil

Analytical results for compounds exceeding RSCOs in subsurface soil samples are summarized in Table 3-2. Analytical results for all the compounds are summarized in Table B-2 (Appendix B). Laboratory data sheets are included in Appendix C.

VOCs were detected at concentrations above RSCOs in two subsurface soil samples (D-P-5 and D-P-15). The compounds detected above RSCOs were acetone in sample D-P-15, with a concentration of 640 ug/kg (the RSCO is 200 ug/kg) and 2-butanone in samples D-P-5 and D-P-15 with concentrations of 3,700 ug/kg and 3,500 ug/kg, respectively (the RSCO is 300 ug/kg). Total VOCs plus TICs exceeded the RSCO of 10,000 ug/kg in 6 of the 13 subsurface soil samples, with the maximum detected concentration of 251,610 ug/kg in sample D-P-15.

SVOCs were detected at concentrations above RSCOs in samples D-P-4 and D-P-9. A total of five compounds exceeded RSCOs, including 2-methylnaphthalene, and four PAHs, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, and benzo(a)pyrene. 2-methylnaphthalene was detected in sample D-P-4 at a concentration of 38,000 ug/kg, above the RSCO of 36,400 ug/kg. The four PAHs were detected in sample D-P-9 at concentrations of 910 ug/kg, 1,200 ug/kg, 1,800 ug/kg and 940 ug/kg, respectively. Total SVOCs plus TICs were detected above the RSCO of 500,000 ug/kg in samples D-P-4 (604,900 ug/kg) and D-P-15 (696,600 ug/kg).

Pesticides and PCBs were not detected at concentrations above RSCOs in any of the subsurface soil samples.

A total of seven metals including arsenic, beryllium, copper, iron, mercury, selenium and zinc, were detected in the subsurface soil samples at concentrations above the RSCOs. Arsenic was detected at concentrations above its RSCO of 7.5 mg/kg in samples D-P-5 (10.3 mg/kg) and D-P-10 (8.4 mg/kg). Copper was detected at a concentration above its RSCO of 25 mg/kg in sample D-P-10 (28.4 mg/kg). Iron was detected at concentrations above its RSCO of 2,000 mg/kg in all thirteen subsurface soil samples. Iron concentrations ranged between 2,900 mg/kg in

**TABLE 3-2
COMPOUNDS EXCEEDING STANDARDS, CRITERIA AND GUIDELINES IN SUBSURFACE SOIL SAMPLES
DOXEY'S PROPERTY**

SAMPLE ID	D-P-1	D-P-2	D-P-3	D-P-4	D-P-5	D-P-6	D-P-9	Contract Required Detection Limit	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH (FT)	3-4	2-3	3-4	6-8	3-4	6-8	6-8		
DATE OF COLLECTION	10/6/2000	10/6/2000	10/6/2000	9/21/2006	10/6/2000	9/20/2006	9/20/2006		
PERCENT SOLIDS	94	86	91	87.0	88	87	88		
DILUTION FACTOR	1	1	1	10	1	10	1		
<i>Volatile Organics, in ug/kg</i>									
Acetone	U	5 J	U	53	480 J	15 J	16 J	10	200
2-Butanone	U	U	U	U	3,700	U	U	10	300
Total VOCs + TICs	2	9	7	75,751	147,080	44,400	100,357	--	10,000
<i>Semivolatile Organics, in ug/kg</i>									
2-Methylnaphthalene	U	U	U	38,000	U	2,300	11,000	330	36,400
Benzo(a)anthracene	U	U	U	U	U	120 J	910 J	330	224 or MDL
Chrysene	U	U	U	U	U	190 J	1,200 J	330	400
Benzo(b)fluoranthene	U	50 J	U	U	U	74 J	1,800 J	330	1,100
Benzo(a)pyrene	U	U	U	U	U	53 J	940 J	330	61 or MDL
Total SVOCs + TICs	6,608	13,030	13,390	604,900	485,800	28,614	145,130	--	500,000
<i>Metals, in mg/kg</i>									
Arsenic	U	U	2.7	4.8	10.3	2.4	3.6	3	7.5 or SB
Beryllium	0.12 B	0.12 B	0.25 B	0.13 B	0.15 B	0.33 B	0.14 B	0.3	0.16 or SB
Copper	2.2 B	4.5 B	16.1	11.2	9.3	8.4	21.8	2	25 or SB
Iron	2,900	3,470	13,700	24,700	6,160	10,500	7,670	2	2,000 or SB
Mercury	U	U	U	0.025 B	0.19	0.035 B	0.024 B	0.1	0.1
Selenium	U	U	U	U	2.2	1.1	0.64 B	5	2 or SB
Zinc	5.5	7.7	22.4	19.3	28.0	22.3	18.4	2	20 or SB

QUALIFIERS:

U: Compound analyzed for but not detected

J: Compound found at a concentration below the CRDL, value estimated

B: Compound concentration is less than the CRDL but greater than the IDL.

NOTES:

MDL: Method Detection Limit

SB: Site background

Result exceeds NYSDEC Recommended Soil Cleanup Objective

**TABLE 3-2
COMPOUNDS EXCEEDING STANDARDS, CRITERIA AND GUIDELINES IN SUBSURFACE SOIL SAMPLES
DOXEY'S PROPERTY**

SAMPLE ID	D-P-10	D-P-11	D-P-12	D-P-13	D-P-14	D-P-15	Contract Required Detection Limit	NYSDEC Recommended Soil Cleanup Objectives
SAMPLE DEPTH (FT)	3-4	8-10	3-4	4-6	5-7	3-4		
DATE OF COLLECTION	10/6/2000	9/20/2006	10/6/2000	9/21/2006	9/20/2006	10/6/2000		
PERCENT SOLIDS	89	89	86	90.0	65	93.0		
DILUTION FACTOR	1	1	1	1	1	1		
Volatile Organics, in ug/kg								
Acetone	U	12	U	10 J	47	640 J	10	200
2-Butanone	U	U	U	U	U	3,500	10	300
Total VOCs + TICs	1,114	57,733	206	18	5,321	251,610	--	10,000
Semivolatile Organics, in ug/kg								
2-Methylnaphthalene	U	29,000 B	U	U	190 J	U	330	36,400
Benzo(a)anthracene	72 J	U	U	U	U	U	330	224 or MDL
Chrysene	100 J	U	U	U	U	U	330	400
Benzo(b)fluoranthene	91 J	U	U	U	U	U	330	1,100
Benzo(a)pyrene	42 J	U	U	U	U	U	330	61 or MDL
Total SVOCs + TICs	15,374	272,400	14,852	159	14,447	696,600	--	500,000
Metals, in mg/kg								
Arsenic	8.4	2.3	U	2.3	5.6	3.2	3	7.5 or SB
Beryllium	0.069 B	0.21 B	0.14 B	0.28 B	0.55 B	0.081 B	0.3	0.16 or SB
Copper	28.4	8.2	2.7 B	11.3	16.9	3.1 B	2	25 or SB
Iron	7,760	6,270	4,530	9,980	13,500	3,520	2	2,000 or SB
Mercury	U	0.028 B	U	0.033 B	0.045 B	U	0.1	0.1
Selenium	0.76 B	1.2	0.82 U	U	U	U	5	2 or SB
Zinc	24.1	22.4	8.6	16.2	77.8	7.2	2	20 or SB

QUALIFIERS:

U: Compound analyzed for but not detected

J: Compound found at a concentration below the CRDL, value estimated

B: Compound concentration is less than the CRDL but greater than the IDL

NOTES:

MDL: Method Detection Limit

SB: Site background

sample D-P-1 to 24,700 mg/kg in sample D-P-4. Mercury and selenium were only detected at concentrations above RSCOs (0.1 mg/kg and 2 mg/kg, respectively) in sample D-P-5 (0.19 mg/kg and 2.2 mg/kg, respectively). Zinc was detected at concentrations above the RSCO in six samples, ranging from 22.3 mg/kg in sample D-P-6 to 77.8 mg/kg in sample D-P-14.

3.3.3 Asbestos

Asbestos was not detected in any of the three surface or subsurface soil samples. Analytical results for the asbestos samples are summarized in Table B-3 (Appendix B). Laboratory data sheets are included in Appendix C.

3.3.4 Groundwater

The pH, specific conductivity, turbidity, temperature and dissolved oxygen measurements for the groundwater samples are summarized in Table 3-3. Compounds exceeding Class GA groundwater standards or guidance values are shown in Table 3-4. The analytical results for the groundwater samples are summarized in Table B-4 (Appendix B). Laboratory data sheets are included in Appendix C.

Upgradient sample D-P-16-GW contained four VOCs (2-butanone, benzene, toluene, and total xylenes) at concentrations above Class GA groundwater standards or guidance values. According to information obtained from the GCCDA, all of these compounds have been detected at similar or greater concentrations in groundwater at designated Superfund sites upgradient of the Doxey's property. In addition to these four VOCs, three additional VOCs (acetone, isopropylbenzene and ethylbenzene) were detected at concentrations exceeding SCGs in the on-site and/or downgradient samples. The concentration of the four VOCs detected above the SCGs in both the upgradient and downgradient samples were generally similar in value. Of the three remaining VOCs in the on-site and downgradient samples, only isopropylbenzene was undetected in the upgradient sample.

Table 3-3

**DOXEY'S PROPERTY
SUMMARY OF FIELD WATER QUALITY PARAMETERS**

Sample Location	Sample Date	Sample Depth (feet)	pH	Specific Conductivity (mS/cm)	Turbidity (NTUs)	Temperature (degrees C)	Dissolved Oxygen (mg/l)	Salinity (%)	eH
MW-C	9/21/06	NA	6.93	10.5	89.0	23.12	2.62	0.6	7
D-P-4	9/21/06	8-12	6.44	0.498	>999	18.15	0.00	0.0	-83
D-P-9	9/20/06	4-8	12.59	6.13	335	27.81	0.45	0.3	30
D-P-11	9/20/06	4-8	7.86	0.003	426	20.99	0.42	0.0	-201
D-P-13	9/21/06	8-12	6.11	0.635	>999	18.64	2.40	0.0	17
D-P-14	9/20/06	5-9	7.72	0.341	>999	21.71	2.15	0.0	-51
D-P-16	9/21/06	8-12	7.17	2.01	>999	24.05	0.00	0.1	-103

TABLE 3-4
COMPOUNDS EXCEEDING STANDARDS, CRITERIA AND GUIDELINES IN GROUNDWATER SAMPLES
DOXEY'S PROPERTY

SAMPLE IDENTIFICATION	D-P-4-GW 8-12	D-P-9-GW 4-8	D-P-11-GW 4-8	D-P-13-GW 8-12	D-P-14-GW 5-9	D-P-16-GW 8-12	MW-C	Contract Required Detection Limit	NYSDEC Class GA Standard or Guidance Value
DATE OF COLLECTION	9/21/2006	9/20/2006	9/20/2006	9/21/2006	9/20/2006	9/21/2006	9/21/2006		
DILUTION FACTOR	1	1	1	1	1	1	1		
UNITS	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	ug/L	ug/L
<i>Volatile Organics</i>									
Acetone	U	100	13	U	U	21	U	10	50 GV
2-Butanone	U	19	U	U	U	170	U	10	50 GV
Benzene	9 J	3 J	13	U	U	6 J	U	10	1 ST
Isopropylbenzene	10	23	23	U	17	U	U	10	5 ST
Toluene	U	U	U	U	U	15	U	10	5 ST
Ethylbenzene	4 J	21	10	U	U	5 J	U	10	5 ST
Xylene (total)	5 J	U	U	U	U	26	U	10	5 ST
<i>Semivolatile Organics</i>									
4-Methylphenol	U	U	U	1 J	U	87 D	U	330	1 ST
Naphthalene	41	160	130	4 J	20	4 J	U	330	10 GV
Phenanthrene	24	51 J	9 J	8 J	4 J	U	U	330	50 GV
Benzo(b)fluoranthene	U	U	U	U	U	U	2 J	330	0.002 GV
<i>Metals</i>									
Antimony (dissolved)	5.0 B	3.3 B	26.1 B	U	10.3 B	2.6 B	29.5 B	3.0	3 ST
Barium (dissolved)	75 B	433	123 B	58.8 B	117 B	3,900	131 B	10.0	1,000 ST
Copper (dissolved)	2.3 B	218	3.1 B	3.6 B	5.7 B	1.7 B	5.1 B	2.0	200 ST
Iron (dissolved)	26,500	966	70,900	3,000	1,120	18,000	559	2.0	500 ST **
Lead (dissolved)	2.8 B	273	14.8	2 B	U	U	U	2.0	25 ST
Magnesium (dissolved)	8,780	329 B	19,100	14,300	5,750	43,300	225,000	3.0	35,000 GV
Manganese (dissolved)	150	15.2	4,480	1,590	1,020	1,070	1,860	4.0	500 ST **
Selenium (dissolved)	3.5 B	11.9	U	6.2	25.5	4.4 B	8.2	5.0	10 ST
Sodium (dissolved)	41,500	114,000	55,100	45,800	40,800	200,000	2,210,000	155	20,000 ST

QUALIFIERS:

U: Compound analyzed for but not detected.

J: Compound found below the CRDL; value estimated.

D: Result obtained from analysis at a secondary dilution.

NOTES:

ST: Standard.

GV: Guidance value.

* Standard applies to the sum of total phenols

** Standard applies to the sum of iron and manganese.

 : Result exceeds NYSDEC Class GA standard or guidance value.

A total of four SVOCs (4-methylphenol, naphthalene, phenanthrene and benzo[b]fluoranthene) were detected at concentrations above the SCGs in the groundwater samples. Upgradient sample D-P-16-GW contained only one SVOC at a concentration above SCGs (4-methylphenol at 87 ug/l). Naphthalene was detected in four of the samples above its guidance value of 10 ug/l, with detected concentrations ranging from 20 ug/l in sample D-P-14-GW to 160 ug/l in sample D-P-9-GW. Both phenanthrene (51 ug/l in sample D-P-9-GW) and benzo(b)fluoranthene (2 ug/l in the sample from well MW-C) were detected at concentrations exceeding SCGs in one sample.

No pesticides or PCBs were detected at concentrations exceeding SCGs in any of the groundwater samples.

In general, all metals except sodium were detected at lower concentrations in the dissolved samples than in the total samples. This indicates that much of the metal concentrations detected in the total samples can be attributed to metals adsorbed to soil particles. Since adsorbed metals will not migrate with groundwater, only the results from the dissolved samples are shown in Table 3-4 and only these results will be discussed.

A total of nine dissolved metals (antimony, barium, copper, iron, lead, magnesium, manganese, selenium and sodium) were detected at concentrations above the SCGs in the groundwater samples. Five of the nine dissolved metals exceeding SCGs were also detected at similar or greater concentrations in the upgradient sample. The metals exceedances in the upgradient sample include barium (3,900 ug/l), iron (18,000 ug/l), magnesium (43,300 ug/l), manganese (1,070 ug/l) and sodium (200,000 ug/l). Concentrations of these metals in the upgradient sample, excluding magnesium and sodium, were greater than or similar to (within one order of magnitude) the concentrations detected in the other samples. The highest concentrations of magnesium and sodium were detected in MW-C, located adjacent to Glen Cove Creek and are likely due to saline groundwater along the Glen Cove Creek bulkhead.

The remaining four metals that exceeded SCGs include antimony, copper, lead and selenium. The groundwater standard for antimony of 3 ug/l was exceeded in four of the six

downgradient samples, at concentrations ranging from 3.2 ug/l in sample D-P-9-GW to 776 ug/l in sample D-P-11-GW. The standards for copper (200 ug/l) and lead (25 ug/l) were exceeded in sample D-P-9-GW at concentrations of 218 ug/l and 273 ug/l, respectively. Selenium concentrations exceeding the groundwater standard of 10 ug/l were detected in samples D-P-9-GW (11.9 ug/l) and D-P-14-GW (25.5 ug/l).

3.4 Data Validation

Groundwater and surface and subsurface soil samples were collected from the Doxey Site on October 6, 2000, September 20 and 21, 2006. The samples were analyzed for Target Compound List (TCL) parameters, Target Analyte List (TAL) parameters and cyanide. Three soil samples were collected and analyzed for asbestos only. The groundwater samples were analyzed for both total and dissolved metals. Sample analysis was performed by Mitkem Corporation, a subcontractor to Dvirka and Bartilucci Consulting Engineers, in accordance with New York State Department of Environmental Conservation (NYSDEC) 6/00 Analytical Services Protocol (ASP) methods.

The data package submitted by Mitkem has been validated in accordance with NYSDEC Quality Assurance/Quality Control (QA/QC) requirements. All environmental sample results, as well as QA/QC sample results, were reviewed for transcription errors and compliance with the NYSDEC ASP to yield a "100% data validation," as stipulated in the work plan. Copies of the data validation forms are included in Appendix D.

The findings of the validation process are summarized below.

The samples collected on October 6, 2000, were not received by the laboratory until October 11, 2000. The laboratory was instructed to proceed with the analysis.

All samples were analyzed within the NYSDEC ASP specified holding times. All QA/QC requirements (i.e., calibrations, tunes, spikes, blanks, duplicates, etc.) were met.

The methylene chloride and trichloroethylene results that are flagged with a "B" on the data summary tables have been qualified as nondetect due to laboratory contamination. That is, the method blanks associated with the samples also contained these compounds and the sample concentrations were less than five times the concentration found in the blank.

Several samples required reanalysis at secondary dilutions to ensure that all compound concentrations were within the instrument calibration range. In those instances, the best set of data is comprised of the initial results with the results for only the compounds in question taken from the diluted run. These results have been flagged "D" on the data summary tables.

Several samples were re-extracted and or reanalyzed due to surrogate recoveries and or internal standard area counts being outside QC limits. The results from analysis which was deemed the most compliant has been considered the best set of data and is included on the data summary tables.

No other problems were found with the data and all results are deemed valid and usable for environmental assessment purposes, as qualified above.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Based on the analytical results presented in Section 3.0, the following conclusions are made:

- Two subsurface soil samples, D-P-5 and D-P-15, contained VOCs at concentrations exceeding SCGs; exceedances were detected for acetone and 2-butanone, also known as methylethylketone, in both samples. Acetone is a common laboratory contaminant, and 2-butanone is a component of cleaning fluids. The specific source(s) of these VOCs was not determined.
- SVOCs were detected at concentrations exceeding SCGs in 10 of the 12 surface soil samples. The six detected SVOCs are polycyclic aromatic hydrocarbons (PAHs) that have been characterized by the United States Environmental Protection Agency (USEPA) as probable human carcinogens. These results indicate that surface soil throughout the majority of the property has been impacted by petroleum, likely as a result of current and/or historic site operations.
- At most locations, the subsurface soil samples contained fewer SVOCs at concentrations that exceeded SCGs, in comparison to the associated surface soil sample. The exceptions to this were locations 4 and 9. At location 4, 2-methylnaphthalene was detected in the subsurface soil sample D-P-4 at a concentration exceeding SCGs, and was undetected in surface soil sample D-SS-4. At location 9, similar concentrations of PAHs were detected in surface soil sample D-SS-9 and subsurface soil sample D-P-9.
- One pesticide, aldrin, was detected at a concentration slightly exceeding its SCG in one surface soil sample (D-SS-7).
- All 12 surface soil samples and all 13 subsurface soil samples contained metals at concentrations exceeding SCGs. However, in most cases, the exceedances are for metals with relatively low toxicities (beryllium, copper, iron, nickel, selenium and zinc). For the more toxic metals (arsenic, cobalt and mercury), the detected concentrations generally only slightly exceeded the SCGs. In addition, similar to the SVOC results, the concentrations of metals detected in the surface soil samples were, in general, higher than those detected in the associated subsurface soil sample.
- The groundwater samples contained seven VOCs and four SVOCs at concentrations exceeding SCGs. Six of these were detected in upgradient sample D-P-16-GW at similar or greater concentrations, in comparison to the on-site/downgradient sample results. Acetone, a common laboratory contaminant, exceeded its SCG in only one

sample (D-P-9-GW). Benzo(b)fluoranthene exceeded its SCG in monitoring well MW-C, located adjacent to Glen Cove Creek in the southwestern corner of the property, and as a result, this detection may represent water quality in the Creek. The remaining three compounds (isopropylbenzene, naphthalene and phenanthrene) are components of petroleum products and may represent impacts from current or historic site operations. However, since public water is provided to the site and measurable salinity readings were identified in several of the groundwater samples (including upgradient sample D-P-16-GW), the use of groundwater at the site is extremely unlikely.

- Nine dissolved metals were detected at concentrations exceeding SCGs. Five of these (barium, iron, magnesium, manganese and sodium) were also detected at similar or greater concentrations in the upgradient sample and, as a result, are unlikely to be site-related. In addition, as described above, use of groundwater is extremely unlikely.

4.2 Recommendations

Based on the conclusions presented above, the following recommendations are made:

- Due to the detected elevated concentrations of PAHs, remediation of the surface and near-surface soils at the Doxey's property through removal or isolation/cover is recommended.
- Soil remediation may be conducted prior to, or as part of, future development of the property. Soil remediation could comprise removal of 2 feet of contaminated soil and replacement of 2 feet of clean soil, placement of 2 feet of clean soil over the contaminated soil, and or placement of building structures or pavement over the contaminated soil. Demarcation of the clean soil from the contaminated soil would be accomplished by placement of demarcation barriers (for example, orange plastic fencing or orange geotextile fabric). Institutional controls, such as a deed restrictions, could be used to prohibit soil disturbance below 2 feet, and under buildings and pavement, and/or to establish requirements for disturbance, handling and removal of soil, if required.
- Depending on the future site use, remediation of subsurface soil in the area of sample locations 5, 9, and 15 may be warranted due to elevated concentrations of individual VOCs or SVOCs detected in these areas. Similarly, remediation of subsurface soil in the area of sample locations 4, 6 and 11 may be warranted due to elevated concentrations of total VOCs and/or SVOCs in those areas.
- Since groundwater use at the site is extremely unlikely, remediation of groundwater is not recommended.
- Due to the shallow depth to groundwater at the site and the detections of low concentrations of VOCs in the groundwater samples, vapor intrusion mitigation measures should be considered during the design of any buildings to be constructed at the site.